ADDITIONAL AQUATIC OLIGOCHAETA FROM AUSTRALIA AND NEW ZEALAND

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ABSTRACT

Two new tubificids (*Rhyacodrilus fultoni, R. bifidus*) are described, with one new phreodrilid (*P. uniseta*). Two tubificids (*Limnodrilus udekemianus, Bothrioneurum vejdovskyanum*) are recorded for the Antipodes for the first time along with the phreodrilid *P. niger*. *Monopylephorus auklandicus* is regarded as a distinct species. The descriptions and subgeneric placements of several oligochaetes are reported, often extending their known range within the Antipodes.

INTRODUCTION

This is the fourth contribution to knowledge of the aquatic oligochaete fauna of Tasmania (see Brinkhurst 1971a, Brinkhurst and Fulton 1979, 1980), the bulk of this collection having been made by Dr. H. B. N. Hynes in the course of his study of streams, mostly in Tasmania. This material is mostly deposited in the Queen Victoria Museum (QVM) Launceston. The A000 numbers refer to the collections by Dr. H. B. N. Hynes, the six (or eight) digit numbers to the Australian National map grid system Tasmap 1: 500,000). A second collection made by W. Fulton in Lake Sorell is also documented.

A few additional records are presented here for the first time including species found in New Zealand (N.Z.) and Australia (A) other than Tasmania.

Family TUBIFICIDAE

Many records of *Tubifex tubifex* (Muller, 1774) and *Limnodrilus hoffmeisteri* Clap., 1862 could be reported, but these species are so widespread that the details will not be presented here. *Limnodrilus udekemianus* Clap., 1862 was collected from the Tokomairio River, (N.Z.) by D. Scott, the first record from that country, and *Aulodrilus pluriseta* (Piguet, 1906) was found in Lake Ohau (N.Z.) at 90-134 m (10/11/78, 12/12/78) by B. V. Timms. *Branchiura sowerbyi* Bedd., 1892 was found in the Thompson River Survey (A) by J. D. Blyth (7/5/77. station T26) the specimen (with the rest of that collection) being in the National Museum of Victoria, Melbourne (Australia).

Genus *Bothrioneurum* Stolc, 1888

Bothrioneurum vejdovskyanum Stolc, 1888

The species was recorded from the Barrington River, Gloucester, New South Wales (A), (A158, 22/8/78) with an immature specimen from the Arve River (A303, 484222, 22/9/78). While the former is a large sluggish river, the latter is a swift mountain river, all collections H. B. N. Hynes.

The mature specimens had external spermatophores attached, prostate cells on the paratria, 4-5 bifid setae, and modified penial setae beside the median male pore. The prostomial pit was not observed, but in all other respects the mature specimens resemble those attributed to this species in Europe and North America. The status of other species in this genus is hard to assess. This is the first certain record from the Antipodes.

A less certain record of *Bothrioneurum vejdovskyanum* than that mentioned in the Hynes collection is that from the Tokomairio River, New Zealand by D. Scott, who collected immature specimens resembling this species.

Genus *Antipodrilus* Br., 1971

Antipodrilus davidis (Benham, 1907) can now be reported from Lake Edward and Lake Leake, Glencoe (S. Australia, A) at 7 m and 4 m (4/8/72 and 13/8/72) respectively, Lake Surprise, McArthur (Victoria, A) 10 m (28/2/72), Lake Mumblin (Victoria, A) 9 m (14/11/71). Also Lake Tekapo (14/12/78) and Lake Marymere (2/2/79) by B. V. Timms and Lake Alexandrina (28/11/78) by V. M. Stout (all N.Z.). Fully mature specimens had ejaculatory ducts as long as those illustrated for *Antipodrilus timmsi* Br., 1971. Specimens from Blue Lake, Mount Kosciusko (New South Wales, A) lacked spermathecal setae, as did those from the adjacent Lake Albina (8/2/77) collected by B. V. Timms. *Antipodrilus plectilus* Br. and Fulton and *A. multiseta* Br. and Fulton have been collected from Lake Sorell (Tasmania) (2/2/81) by W. Fulton.

Genus *Monopylephorus* Levinsen, 1884

The antipodean species *Rhizodrilus aucklandicus* Benham, 1909 was at one time synonymized with the Atlantic coast species *Monopylephorus irroratus* (Verrill, 1873) as both possess curious thin, twisted hair setae. A recent revision of the genera *Rhizodrilus* and *Monopylephorus* by Baker and Brinkhurst (1981) has established that the antipodean species should be named *Monopylephorus aucklandicus*. The earlier account of the antipodean aquatic oligochaetes by Brinkhurst (1971a) referred to the species as *M. irroratus* and provided illustrations (Figs. 3A, B) based on the European *M. irroratus* and the N.E. Pacific species *Monopylephorus cuticulatus* Baker and Brinkhurst respectively. These illustrations should be ignored as they no longer apply to the antipodean species.

Genus *Rhyacodrilus* Bretscher, 1901

Material: A *Rhyacodrilus* species was collected from Vincent Hill, Tasmania (A281, 534323, 19/9/78) and a tributary of Franklin River, Victoria (A) (A180, 13/8/78) by H. B. N. Hynes. Neither specimen was fully identifiable, but the interesting point is that neither seemed to have prostate glands on the atria. The New Zealand species *Rhyacodrilus simplex* (Benham 1903) was originally described under the generic name *Taupodrilus* because of this characteristic, and the genus may have to be reinstated when *Rhyacodrilus* receives its overdue revision. It is not possible to attribute these specimens to *R. simplex* for certain. Both localities were streams silted up to some degree by human activities.

Description: The Australian specimen has 2-5 pectinate setae and two hair setae in anterior dorsal bundles, and fairly elongate spermathecae. The Tasmanian specimen has about four pectinate setae with teeth more or less like those of the ventral setae, but diverging; dorsal setae 1-2 long hair setae and some shorter; 4-6 ventral setae with teeth diverging, the upper thinner but as long as the ventrals. The spermathecae are small, globular, with short ducts and are full of loose sperm. The atria are of slightly ovoid form, without visible prostates, and with short vasa deferentia turned around the ampullae. Penial setae are present (six per bundle), as are large obvious coelomocytes.

Another *Rhyacodrilus* species with hair and pectinate setae was found in Lake Roiti, Guller Basin, South Island (N.Z.) at 80 m (2/10/78) by B. V. Timms, but this could not be identified further.

Another, with twelve penial setae, pectinate setae dorsally, and hair setae from II to XIV, was found in Lake Hawdon, (N.Z.) at a depth of 1.5 m in 1979 by B. V. Timms. These are mentioned simply to prevent such material from being identified as *Rhyacodrilus coccineus* (Vejd.). There seems to be a number of potentially new species in this genus, which is complicated by the fact that several existing species are inadequately described.

Rhyacodrilus fultoni sp. nov.

Plates 1-5

Material: Many specimens from Lake Sorell, collected by W. Fulton 2/2/81 (1 serial section, 4 dissections, 22 whole mounts, rest in fluid).

Holotype: 1981/14/3 — QVM type 394 (3 slides).

Paratype: 1981/14/8 — QVM type 397 (12 slides and 2 bottles of alcohol specs.), and Brinkhurst collection.

Description: Worms approximately 15 mm x 0.5 mm, about 100 segments (worms mostly fragmented). Setae all bifid with teeth equally long. 10-13 per bundle anteriorly, fewer posteriorly, ventral bundles of XI with 7-9 straight rhyacodriline penial setae. Male ducts with short vasa deferentia entering the curved-over summits of curved atria which discharge via voluminous sacs with narrow external openings. Bundles of sperm visible within the atria. Spermathecae with voluminous ampullae full of loose masses of sperm, ducts short and broad opening through large pores. Coelomocytes large and fairly abundant.

Discussion: This is another species that may well be grouped with *R. simplex* in a reinstated genus *Taupodrilus* as it also lacks a prostate gland. It is distinguished from what must still be referred to as *Rhyacodrilus simplex* pending a revision (see above) in that it lacks hair and pectinate setae, although in many tubificid genera this difference alone would only serve to separate the taxa at some subspecific level. The problem here is that *R. simplex* requires redescription, and it would be unwise to associate *R. fultoni* with that taxon now.

Rhyacodrilus species with bifid setae only all have prostate glands (*R. stephensoni* Cern., 1942 from Asia and South Africa, the holarctic *R. falciformis* Bretscher, 1901, and the European cave species *R. balmensis* Juget, 1959). They also have fewer setae. *Rhyacodrilus levanidovae* Sok., 1959 has fewer setae and some posterior ventrals are slightly pectinate. The species is recorded from water bodies in the basin of the Kamchatka River, Kamchatka, Asia (Sokolskaya, 1973). *Rhyacodrilus arthingtonae* Jamieson, 1978 has been transferred to *Rhizodrilus* Smith (see Baker and Brinkhurst 1981). *Rhyacodrilus carsticus* (described by Kosel, 1980) has spermathecal as well as penial setae.

Rhyacodrilus bifidus sp. nov.

Plate 6

Material : Lake Cootapatamba and Blue Lake, Mount Kosciusko, New South Wales (A) (7/2/77) Lake Howden 1.5 m (1979) Lake Matheson 9 m (1978), and Lake Gault 8 m (1978), all in the Canterbury High country, (N.Z.) and all collected by B. V. Timms. Also Thompson River, Thompson Portal Road Victoria, (A), (25/11/76), by J. B. Blyth, now in the National Museum of Victoria, Melbourne (Australia).

Holotype : 1981/14/4 — QVM type 395, (2 slides) Blue Lake, Mnt. Kosciusko, New South Wales (A).

Paratype : 1981/14/5 — QVM type 396 (4 slides).

Description : Dimensions unknown, specimens incomplete. Prostomium blunt, shorter than wide at peristomium. Clitellum on X-XI. Sometimes with foreign material adhering to body wall from IX. Setae bifid, (3) 4-7 (8) anteriorly, 2-4 posteriorly; anterior setae with upper teeth 2-3 times longer than but thinner than the lower, posteriorly upper teeth decreasing in length, lower teeth becoming broader; setae increase in size to V and then decline slightly. Penial setae from 6-10 per bundle, nearly twice the length of the somatic setae, rhyacodriline in form. Atria tubular, four times broader than long, ending in wide bulbs with narrow pores to the anterior face of continuations of penial setal sacs, these with narrow pores to the exterior. Vasa deferentia about as long as atria, joining apically. Prostates large, attached subapically, presumably diffuse. Spermathecae ovoid with short ducts, sperm in loose bundles. Elaborate lips on spermathecal pores. Coelomocytes present, not abundant.

Discussion : This is another rhyacodriline with bifid setae, this time with the upper teeth distinctly longer than the lower, unlike the other species mentioned above. The atria and their terminal bulbs are very similar to those of *R. fultoni* but there are prostate glands in this instance. One specimen was in sufficiently good condition to section, and nineteen whole mounts and dissections were prepared.

Genus *Telmatodrilus* Eisen, 1879

Telmatodrilus multiprostatus Brinkhurst, 1971

Plate 7

Material : Several immature and a few mature specimens of this unusual species were recorded as follows :

Mature worms — Cuvier River (A345, 428342, 10/10/78) Collingwood River (A425, 407335, 4/11/78) trickle under The Needles (A450, 454269, 11/11/78) creek in Frodsham's Pass (A461, 450260, 12/11/78).

Immature specimens — Keogh's Creek, North Lune River (A305, A321, 488194, 1/10/78) trib. Collingwood River (A426, 407335, 4/11/78) Double Barrel Creek (A428, 416326, 4/11/78) trickle, 1 km west King Williams Saddle (A432, 426326, 5/11/78) Tyenna River (A434, 477275, 8/10/78). These are all cool stony mountain streams in Eucalypt forest in Tasmania (H. B. N. Hynes coll.), but it was also collected from Lake Sorell, Tasmania by W. Fulton (2/2/81).

Discussion : This distinctive species is readily identifiable by the spermathecal setae, which lie in segment X in all specimens known apart from the single paratype redescribed by Holmquist (1974). The original description of *T. multiprostatus* was extended by Brinkhurst (1971b), but it should be noted that there are no spermatozeugmata. At present, the author prefers to leave all the tubificids with multiple prostate glands in this one genus until more is known about possible generic characters.

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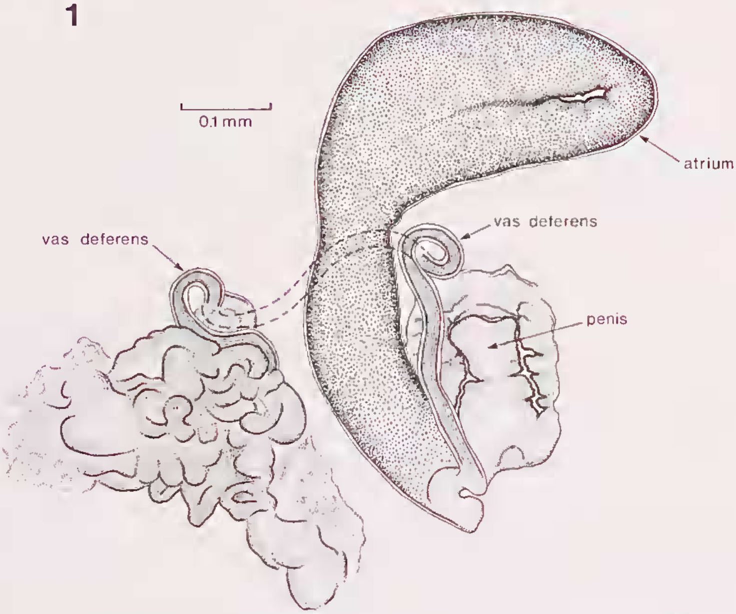

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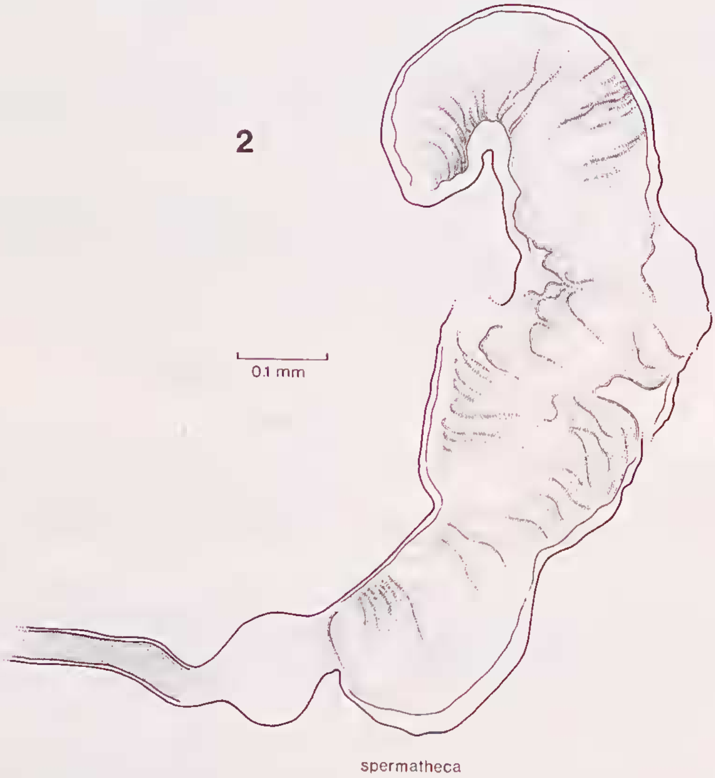


Figures 1 - 2 *Phreodrilus niger*
1. Male duct.
2. Spermathecal ampulla.

Family PHREODRILIDAE

Genus *Phreodrilus* Beddard, 1891

Phreodrilus (*Antarctodrilus*) *niger* (Beddard, 1894)

Figures 1 and 2

Material : Keogh's Creek (A305, 484223, 27/9/78) Headwater, West Creek, (A306, 481224, 27/9/78) West Creek (A307, 483225, 27/9/78). trib. of Arve River on Hartz Mountain Road (A310, 483216, 28/9/78) creek north of The Needles (A465, 456269, 13/11/78) stream 1 km east of summit on road below The Needles (A448, 455269, 11/11/78) stream 1 km from top of Hartz Mountain Road (A509, 482217, 8/12/78). Varied mountain streams in eucalypt forest collected by H. B. N. Hynes, all in Tasmania.

Description : Dorsal setae two hairs per bundle, one thick and bent, one thin and straight, ventral setae one thick and one thin, both sometimes simple-pointed or the thicker with a small upper tooth. The male ducts with relatively short, broad atria and very long, tightly coiled vasa deferentia, uniting to terminate in large penes. The spermathecal pores are in the dorsal setae line in the interseptal groove, the dorsal setae being absent in XII - XIII.

Discussion : This is the only species with this combination of characters (see Brinkhurst, 1971b), though it has been described under four different names. The atrial lumen in some specimens is much wider than in others, the lining cells being appropriately reduced. This supports the contention that the thin-walled atria of *Phreodrilus notabilis* (Benham, 1907) described from a single specimen, may represent the final condition of that organ (Brinkhurst, 1965). Previously known from South America, South Africa and Falkland Isles, the species is now recorded from the Antipodes.

Phreodrilus (*Antarctodrilus*) *proboscidea* Brinkhurst and Fulton, 1979

Figures 3 - 5

Material : Mature specimens — tributary South George River (A268, 576424, 7/9/78), Keogh's Creek (A305, 484223, 27/9/78), North Lune River (A321, 488194, 1/10/78), trib. Inglis River, Calder (A396, 383453, 20/10/78), Black River (A398, 364461, 30/10/78), gully to Arthur River (A404, 330447, 31/10/78), trib. Bulgobac River, (A414, 389394, 2/11/78), Animal Creek (A415, 385390, 2/11/78), Farm Creek (A416, 384384, 2/11/78), Henty River (A419, 374350, 3/11/78), trib. Yolande River (A421, 376347, 12/11/78), creek Frodsham's Pass (A461, 450260, 12/11/78), trickle, 1.4 km E, of summit on road below The Needles, (A464, 455269, 13/11/78), creek N.E. of The Needles (A466, 457269, 13/11/78), stream 1 km from top, Hartz Mountain Road near tree-line (A509, 482217, 6/12/78), all Tasmania, plus top tributary of Tidal River, Wilson Promontory, Victoria (A).

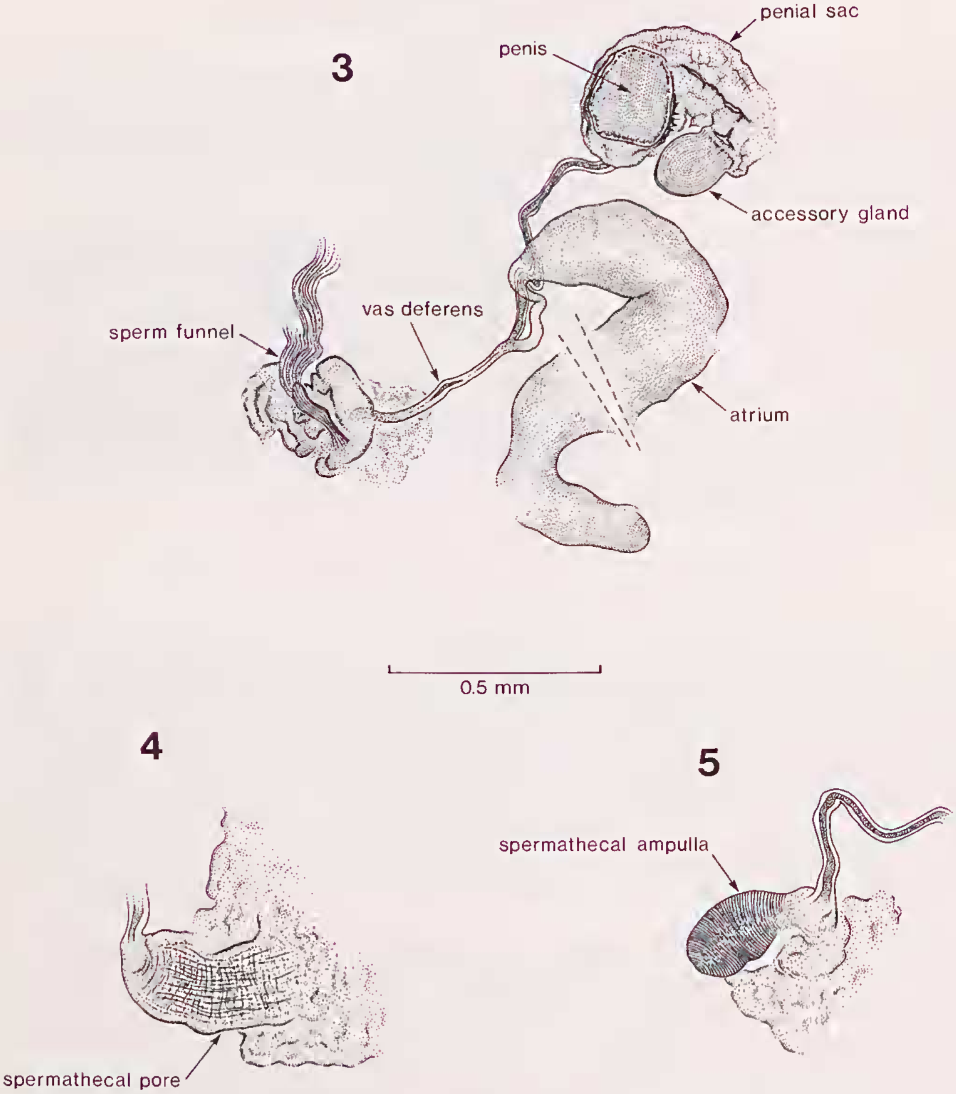
Immature specimens at forty other localities in various mountain streams, all in eucalypt forest except for the Inglis River, in partly cleared land (all material in the H. B. N. Hynes collection).

Description : Prostomium with proboscis. Dorsal setae from III, 2 - 4 or more serrate hair-setae, long, thin and straight, with numerous shorter needles (usually one on each side of each hair, perhaps simply cuticular setal sacs). Ventral setae one thin, one thick, the thicker shorter more curved seta bifid with thin, indistinct at times, short or rudimentary upper tooth, usually missing on first few pairs of setae. Reproductive system typical of other species in this family. The atria and vasa deferentia unite to form quite elongate ejaculatory ducts that enter large penes. The penes, often covered with secretory material with granules, presumably foreign matter, included, are large with wider internal continuations of the vasa deferentia leading to wide male pores at the distal ends of the penes. The penes lie at the summit of large penis sacs, each of which bears a solid accessory structure, presumably of glandular function, which has similar secretory material with granules. Male pores in place of the missing ventral setae on XII, female pores on XIII, halfway between 12/13 and the setae on XIII, spermathecal pores dorsal in front of the dorsal setae on XIII, with large vestibulae.

Discussion : The original preliminary description was based on immature specimens from Great Lake and Lake Pedder, Tasmania. At the time it could not be assigned to a subgenus as these are based on the form of the penes and position of the spermathecal pores. It can now be seen to belong to the subgenus *Antarctodrilus* Brinkhurst, 1965 on the basis of the above description of the large new collection.

The only other species in the subgenus is *P. niger*, but it lacks the ejaculatory duct and the accessory copulatory gland, the proboscis and the serrate hair setae.

The only other species in the family with an accessory gland like that described here is *P. maulenensis* Brinkhurst, 1971 (q.v.).



Figures 3 - 5 *Phreodrilus proboscidea*
3. Male duct.
4. Spermathecal pore with vestibule.
5. Spermathecal ampulla.

Another unidentified phreodrilid from among cobbles and pebbles in the Thompson River at Portal Road, (25/11/76) collected by J. D. Blyth, had 2 - 4 serrate hair setae dorsally, dissimilar ventral setae, large penes and very large spermathecal vestibulae. It is apparently a member of the subgenus *Antarctodrilus*, which has now been recorded from Tasmania (see above). This specimen may well belong to the species *P. proboscidea*, being unidentified only because the proboscis has been detached, as is the case in some of the material described above. The specimens are all in the National Museum, Victoria (A).

Phreodrilus (*Phreodrilus*) *mauienensis* Brinkhurst, 1971

Figure 6

Material : This species can now be reported from a variety of locations in New Zealand viz : Tokomairiro River, D. Scott; Lake Tekapo, (14/12/78) Lake Pakoli 56-91 m (16/11/78), Lake Ohau (16/11/78), Lake Rotoiti 60 m (2/10/78) all collected by B. V. Timms, and Pelorus Bridge (6/2/78) collected by V. M. Stout. All of the previous records of the species are from New Zealand (Brinkhurst 1971a, b). Naidu and Naidu (1980a) reported immature *P. mauienensis* from both Tasmania and New South Wales (A), but the record must be confirmed from mature specimens.

The accessory gland on the male duct was incorrectly illustrated in the original account. The distal and proximal parts of the male duct are closely bound together in the entire animal, and only after careful dissection of good specimens could the true location of this structure be established. It should be compared with that of *P. proboscidia*.

Phreodrilus (*Phreodrilus*) *branchiatus* Beddard, 1891

Figures 7-10

Material : This characteristically gilled species was present in the following localities.
Both immature and mature : Coquet Creek (A220, 528421, 26/11/78), Wyena tributary of Fraser River (A227, 522439, 2/9/78), Keogh's Creek (A305, 434223, 27/9/78), North Lune River (A321, 488194, 1/10/78), Arve River, top road crossing (A314, 481215, 29/9/78). Flowerdale River (A388, 377477, 26/10/78), Hatfield River tributary (A411, 388404, 1/11/78), Stream N. of Cethana (A484, 427408, 21/11/78, Barrow Creek (A508, 531423, 26/11/78), all collected by H. B. N. Hynes in Tasmania.
Immature : Poor Fellow Me Creek, Victoria (A) (A163, 8/8/78), plus Nive River, Bronte (A331, 456333, 6/10/78), Stoney Creek (A383, 473374, 25/10/78), Tasmania, all collected by H. B. N. Hynes.

Habitat : All sites are swift streams or small fast flowing rivers except for Poor Fellow Me Creek, which is slower flowing. Some sites in forests, others in partly cleared land.
Description : The spermathecal pores are in line with the dorsal setae and have vestibulae. The atrium and vas deferens junction is close to the fairly long eversible pseudopenis in this species, the latter being the simplest of these organs observed in the family (Brinkhurst, 1965).

The immature specimens were distinguishable by the presence of gills. The hair setae on anterior fragments are longer than those on *P. niger*.
Discussion : The species was first recorded from Tasmania by Brinkhurst and Fulton (1979) and independently by Naidu and Naidu (1980a).

Phreodrilus (*Insulodrilus*) *tanganyikae* Br., 1970 new combination.

The species *P. tanganyikae* Brinkhurst 1970 was placed in the subgenus *Astacopsidrilus* based on a possible similarity of the thin-walled spermathecal vestibulae of that species with the inadequately described spermathecal pores of the three poorly-known species in the subgenus, two of which are parasites of crayfish. It has large penes (in fact with cuticular penis sheaths) and ventral spermathecal pores associated with 2 - 4 spermathecal setae, and therefore the best alternative subgeneric placement would be with the four *Insulodrilus* species. Spermathecal setae are also reported in the poorly-known *P. kerguelenensis* (Michaelsen, 1903) and *P. nothofagi* (Stout, 1958), as discussed by Brinkhurst (1970, 1971a, b).

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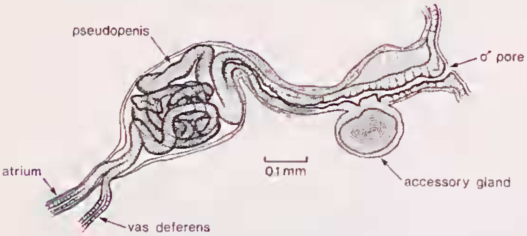

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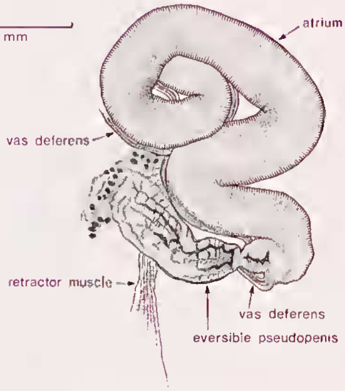

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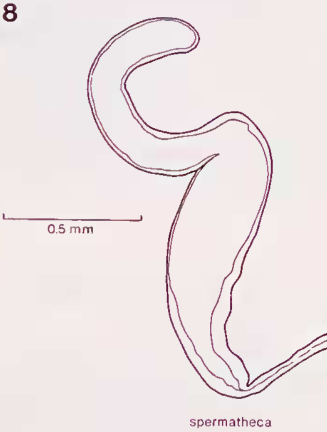

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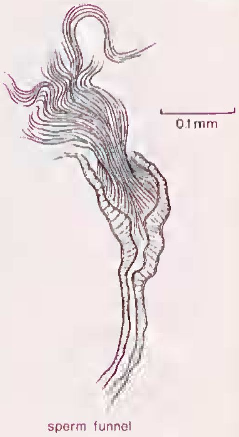

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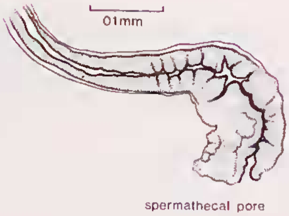

Figure 6 *Phreodrilus mauienensis*
6. Male duct.

Figures 7 - 10 *Phreodrilus branchiatus*
7. Male duct.
8. Spermathecal ampulla.
9. Spermathecal pore.
10. Sperm funnel.

Phreodrilus (*Insulodrilus*) *uniseta* sp. nov.

Figures 11-14

Material : Flowerdale River, Tasmania (A387, 376447, 26-28/11/78) collected by H. B. N. Hynes.

Holotype : 1981/14/1 — QVM type 392 (3 pieces in alcohol)

Paratype : 1981/14/2 — QVM type 393 (2 slides)

Additional Material : 1 mature specimen, trickle 1 km west of King William Saddle (A432, 426326, 16/9/78) collected by H. B. N. Hynes), dissected.

The primary location is in heavy rain forest on a large Tasmanian river.

Description : Specimens incomplete, dimensions unknown. Worms darkly pigmented, obscuring internal anatomy. Dorsal setae from III, IV or V, single sigmoid, simple-pointed, one bifid, no spermathecal setae. Atria relatively short and broad, lumen wide and full of secreted material, male funnels large, vasa deferentia strongly coiled, (presumably) join atria at the bases to form short ejaculatory ducts, penes robust, conical in large penis sacs. Spermathecal pores ventro-lateral, in line of ventral setae, with apparent small muscular vestibulae, ampullae many segments posteriad.

Discussion : This provisional description serves to demonstrate yet another pattern of dorsal setae in this family. Most species have hair setae in the dorsal bundles, varying from single setae in several species to as many as nineteen per bundle in one, but this new species has sigmoid setae resembling those of the ventral bundles.

Phreodrilus (*Insulodrilus*) *plumaseta* Br. and Fulton, 1979 emended.

Plates 8 - 10

Examination of two mature specimens whole-mounted and two serially sectioned (in the author's collection) confirm the presence of large true penes, vestibulae on the ventro-lateral spermathecal pores, and very large paired spermathecal setae. The species is therefore a member of the subgenus *Insulodrilus*, not *Phreodriloides* as tentatively suggested in the original description. The specimens were collected in Lake Sorell, Tasmania by W. Fulton (2/2/81).

Phreodrilus (*Insulodrilus*) *magnaseta* Br. and Fulton, 1979

Plate 11

This species was also found in Lake Sorell, Tasmania by W. Fulton (2/2/81). Five sectioned and three whole-mounted specimens remain in the author's collection.

Other *Phreodrilus* (*Insulodrilus*) material

Specimens which can be attributed to *P. litoralis* (Mich., 1924) were found by B. V. Timms in Lake Rotoiti (N.Z.) (2/10/78) and a specimen resembling *P. campbellianus* Benham, 1909 was found in the Thompson River survey 7 km N.N.W. of Walhalla, Victoria (A) by J. D. Blyth (5/12/77). This would constitute the first record of that species outside Campbell Island if verified. The spermathecal setae are supposedly absent in *P. campbellianus*, whereas they are present as single setae on each side of the body in the otherwise similar *P. litoralis* (Mich. 1924) which is also restricted to Campbell Island. Both of these are described as having paired ventral setae with one relatively thin and straight with a simple distal end, the other broader, shorter with a rudimentary upper tooth. A very similar third species, *P. lacustris* Benham, 1903 is recorded in New Zealand. It has the same setae anteriorly but both posterior setae are said to be bifid. The type is no longer available for checking this point. Recent specimens from New Zealand described by Brinkhurst (1971a, b) seem to have nothing but simple-pointed ventral setae, although many were damaged. The spermathecal setae are said to be paired in this species, but in all phreodrilids and tubificids with spermathecal setae they may be single or paired, depending on the presence of developing replacement setae. Trivial setal differences alone should not be used to separate these taxa, and detailed studies of larger sets need to be made before their status can be properly determined.

While *P. nudus* Br. and Fulton, 1979, has paired spermathecal setae, they are longer and thinner than those of the New Zealand specimens I attributed to *P. lacustris*. Two of the original specimens of *P. nudus* described by Brinkhurst and Fulton (1979) are still in my collection, the one from the South Esk River, Tasmania has ventral setae in which one is clearly bifid, the other having a rudimentary upper tooth that may be worn off or invisible

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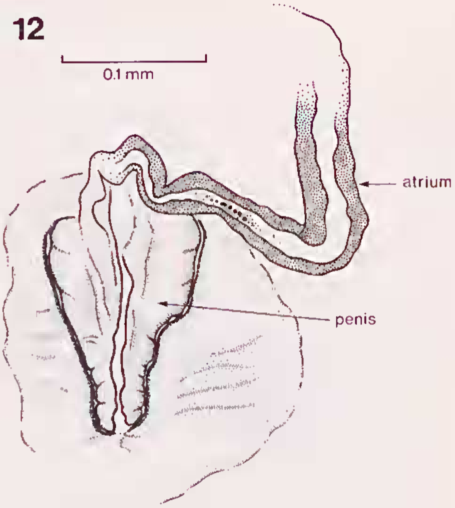

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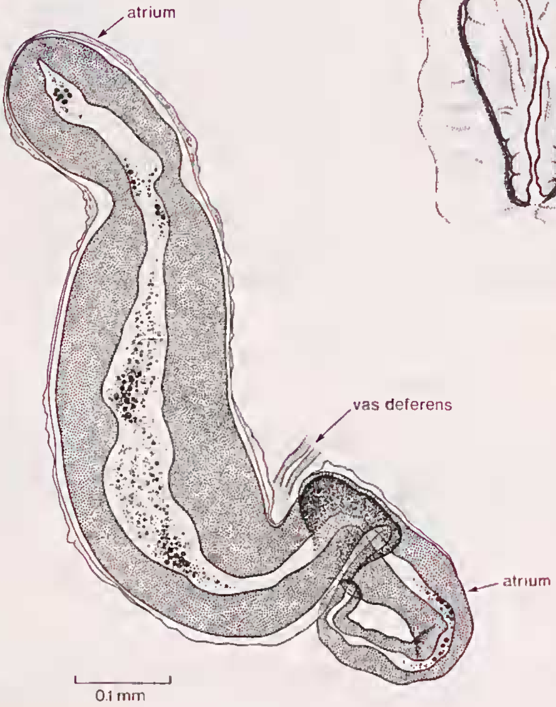

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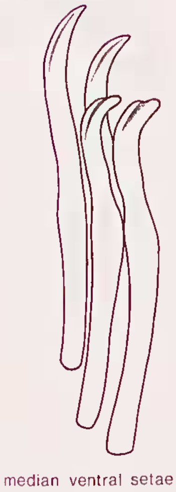

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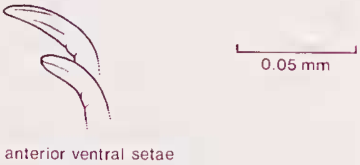

Figures 11 - 14 *Phreodrilus uniseta* sp. nov.
11. Male duct.
12. Penis.
13. Anterior ventral setae.
14. Median ventral setae.

in many segments. The second specimen, from Lake Pedder, has setae of dissimilar length, width and curvature, both of which are clearly bifid. A single specimen collected at Anglers Creek, Tasmania (A282, 570324, 16/9/78) by H. B. N. Hynes belongs to this complex, perhaps to *P. nudus*, as it has spermathecal pores with vestibulae as well as true penes. The ventral setae of this specimen are dissimilar in width and curvature in some posterior segments, the thinner seta being indistinctly bifid while the thicker one is obviously so. Another specimen possibly identifiable as *P. nudus* was collected in the Thompson River 7 km N.N.W. of Walhalla, Victoria (A) by J. D. Blyth (5/12/77), so this complex is not restricted to Tasmania.

Family NAIDIDAE

Nais pseudobtusa Piguet, 1906 was reported by Naidu and Naidu (1980b) from a single specimen collected in Lake Eacham, Queensland by B. V. Timms. It is a widely distributed species.

Family LUMBRICULIDAE

Immature specimens apparently identifiable as *Lumbriculus variegatus* (Muller, 1774) were found in a tributary of the Rubicon River (A192, 463407, 19/8/78) and in the Nive River at Bronte, Tasmania (A331, 456333, 6/10/78) by H. B. N. Hynes. Until recently this was the only lumbriculid reported from the southern hemisphere, but now the other common holarctic species, *Stylodrilus heringianus* Clap., 1862 has been recorded in New Zealand (Marshall, 1978).

Family HAPLOTAXIDAE

Haplotaxis heterogyne Benham, 1903

Figure 15

Three specimens attributable to *Haplotaxis heterogyne* were collected in Arthurs Lake, Tasmania (23/7/77) by W. Fulton. They closely resemble the better known *H. gordioides* (Hartmann, 1821) in that the large, solitary ventral setae are sigmoid, the dorsal setae are small and straight, but they differ in that dorsal setae are present in all segments,* and also the prostomium, although long, is not divided by a furrow. The original description says that mature specimens lack the posterior ovaries and have two pairs of spermathecae according to Benham (1903), who recorded the species from a great depth in Lake Wakatipu, South Island, New Zealand. It has never been seen since.

* See below

Another haplotaxid resembling *H. gordioides* was found in Lake Mason, New Zealand at 5 m (23/3/79) by V. M. Stout. The specimen needs now to be compared with the Tasmanian material. *H. gordioides* would seem an unlikely candidate for introduction to a remote lake such as Lake Mason, although more common holarctic species such as *Stylodrilus heringianus* and *Lumbriculus variegatus* seem to have been introduced to the Antipodes. Specimens attributed to *H. gordioides* from North America (Brinkhurst and Cook, 1966, Cook 1975) possess dorsal setae in all the segments, which is unusual in the original European form. A new species from the River Parana, Brazil, (as yet undescribed) has the same setal pattern as other species in the group (without dorsals) but has distinctive hair-like genital setae in addition. It is therefore quite possible that there are several quite similar taxa widely distributed around the globe.

DISCUSSION

It is clear that, with further collecting, the list of aquatic oiligochaetes known from Antipodean freshwaters will increase by the discovery of widely distributed species such as *Bothrioneurum vejdovskyanum*, introductions from the holarctic such as *Stylodrilus heringianus* and new endemic forms, especially in the family Phreodrilidae.

While Brinkhurst and Fulton (1979, 1980) found eleven new species in collections from Tasmania, mostly from Great Lake, the Hynes collection from rivers and streams revealed only one new species (*P. uniseta*) and two new records (*B. vejdovskyanum* and *P. niger*) for the Antipodes. The other smaller collections add only two new species, *R. fultoni* from Tasmania and *R. bifidus* from Australia and Tasmania, but other *Rhyacodrilus* species remain to be fully described. *Phreodrilus litoralis* and *P. campbellianus*, both formerly restricted to Campbell Island, (south of New Zealand) have probably been found in New Zealand and Australia respectively, but large samples will be required to establish the

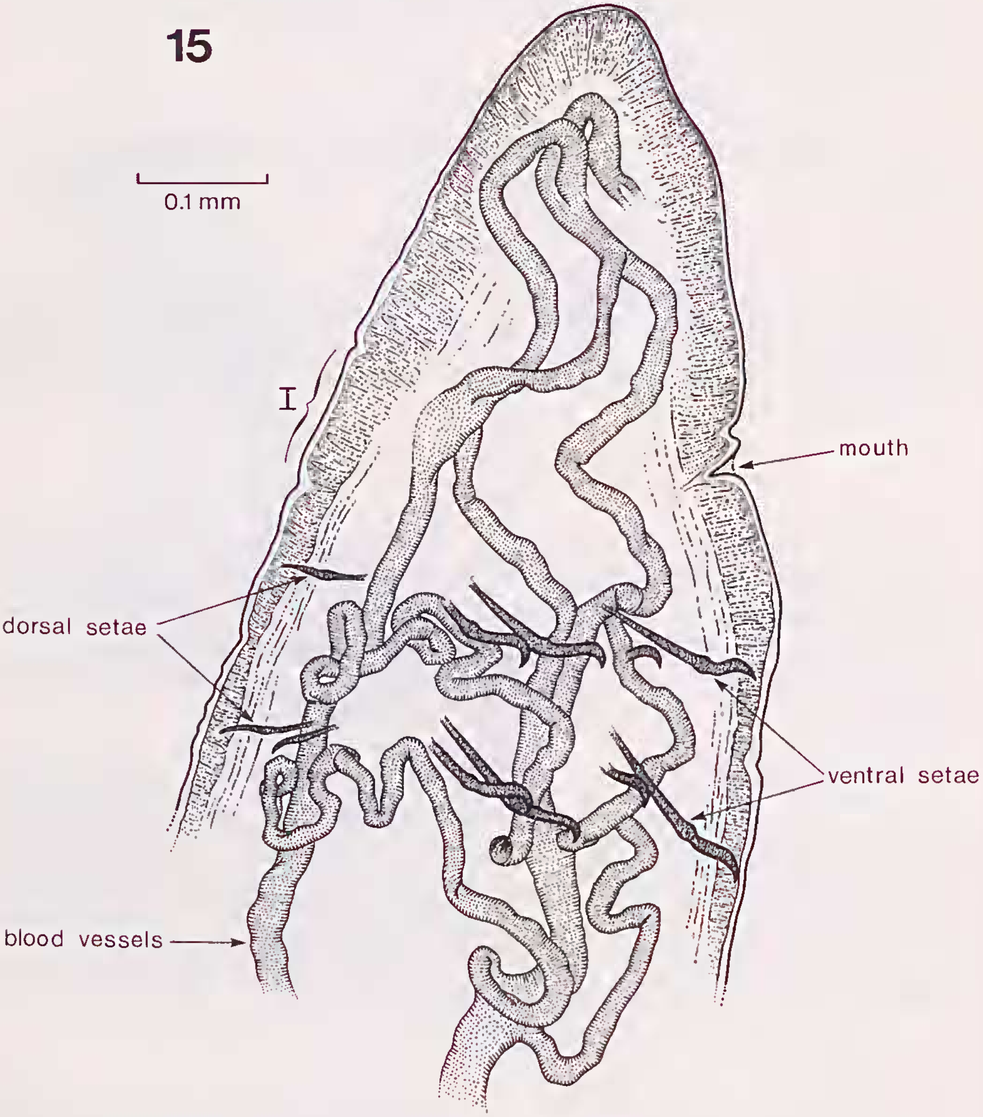

Figure 15 *Haplotaxis heterogyne*
15. Anterior end, whole mount I — segment 1.

separation of species in the phreodrilid subgenus *Insulodrilus*. *Phreodrilus proboscidea* has now been found in Australia in addition to Tasmania.

In the Phreodrilidae and Tubificidae there are still some species that appear to be of limited distribution within the Antipodes (9 in New Zealand, 7 in mainland Australia, 11 in Tasmania, 5 in other adjacent islands) but the other southern hemisphere species (such as *Antipodrilus timmsi*, *Phreodrilus branchiatus* and *Phreodrilus proboscidea*) are more widely distributed. Five cosmopolitan species are found widely through the region as would be expected.

The haplotaxids are usually very restricted in terms of distribution. Forms resembling the European *H. gordioides* are widely distributed in contrast, but as many of the identifications are based on a few immature specimens it may prove necessary to distinguish species once mature specimens are collected.

Several species in this small family are found in the Antipodes, 3 in New Zealand, 2 in both South West Africa and some of the small islands, and 1 endemic to Tasmania (Brinkhurst 1971a, b, Brinkhurst and Fulton 1980), so the possible discovery of *H. heterogyne* in Tasmania in addition to New Zealand is of some significance.

The degree of separation of the mainland Australian and Tasmanian aquatic faunas has been reviewed by Hynes and Hynes (1980).

ACKNOWLEDGEMENTS

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